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RELATION OF RETARDATION TO ELIMINATION OF STUDENTS FROM THE HIGH SCHOOL

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The purpose of this study was to compare the class standings and progress through the grades of those who leave the high school before completing the course, with those who continue until graduation; to find, in other words, if there was a distinct qualitative difference between the pupils whom the high schools graduate and those whom they eliminate.

Other questions, phases of the main problem, are also considered. For instance: (1) How does the qualitative elimination of boys from the high school compare with that of the girls? A study is made of the different subjects taken by the pupils in high school in order to ascertain if one subject in the curriculum more than another influences elimination. A comparative study is also made of the age of entrance of the two groups, i.e., of the graduates and non-graduates, to ascertain how great an influence, if any, the age of entering the high school has upon elimination.

It is here assumed that the grades given to a pupil by his teacher constitute a measure of that pupil's ability to do the work which the school curriculum prescribes. Upon this assumption are based the qualitative comparisons made in this study.

DISTRIBUTION OF CLASSES AND STUDENTS

The investigation is based upon the records of 23 different high-school classes of the Iowa City High School. The classes taken were those entering the high school from September, 1897, to September, 1908, inclusive. There are two classes entered each year: one in September, at the beginning of the year; the other in January or February, at the beginning of the second semester.

The total number of pupils enrolled in these 23 classes was 1,042, of which 483, or 46 per cent, were boys and 559, or 54 per cent, were

girls. The boys exceeded the girls in nine classes, and the girls were in the majority in the other fourteen classes.

ELIMINATION BY GRADES

The total number of students enrolled as Freshmen in the 23 classes studied was 1,042; of this number 491, or 47 per cent, graduated and 551, or 53 per cent, dropped out before completing the course. In comparing the graduates and non-graduates as to number, we find there are 60, or 6 per cent, more eliminated than remain to complete the course. The number of students who dropped out was found to be the largest during the first semester and to decrease from grade to grade through the four years of the high school. The distribution is given in Table I.

TABLE I

SHOWING DISTRIBUTION OF PUPILS ELIMINATED FROM THE HIGH SCHOOL DURING EACH SEMESTER OF THE FOUR-YEAR COURSE

Elimination based, not on the length of time in school, but on the different grades of the course during which the pupils dropped out.

	TOTAL ENTERED	FRESHMAN		SOPHOMORE		JUNIOR		SENIOR		TOTAL
		1st Sem.	2d Sem.	1st Sem.	2d Sem.	1st Sem.	2d Sem.	1st Sem.	2d Sem.	
Boys.....	483	91	54	46	24	20	17	6	8	266
Girls.....	559	77	61	54	41	19	15	11	7	285
Combined.....	1,042	168	115	100	65	39	32	17	15	551

TABLE II

SHOWING THE DISTRIBUTION OF ELIMINATION BY PERCENTAGE DURING THE DIFFERENT SEMESTERS THROUGHOUT THE FOUR YEARS OF THE HIGH SCHOOL

	TOTAL PERCENT- AGE EN- TERED	FRESHMAN		SOPHOMORE		JUNIOR		SENIOR		TOTAL
		1st Sem.	2d Sem.	1st Sem.	2d Sem.	1st Sem.	2d Sem.	1st Sem.	2d Sem.	
Boys.....	100	18.84	11.18	9.52	4.97	4.14	3.52	1.24	1.66	55.07
Girls.....	100	13.78	10.91	9.66	7.33	3.40	2.68	1.97	1.25	50.98
Combined..	100	16.12	11.04	9.60	6.24	3.74	3.07	1.63	1.44	52.88

In comparing the sexes, we find that the elimination of the boys is greater than the elimination of the girls, the former being 55 per cent and the latter 51 per cent of the total enrolment in each case.

The first year is the most critical one for both boys and girls. Of the 266 boys who dropped out, 145, or 55 per cent, were eliminated during the first year. Of the 285 girls who were eliminated during the four years, 138, or 48 per cent, dropped out during the first year. Combining the boys and girls, we find that 283 of the 551 eliminated, or 51 per cent, were eliminated during the first year.

PASSING GRADES AND FAILURE DISTRIBUTION

The distribution of the passing grades and failures made by the 1,042 pupils studied was as follows: the 483 boys made 9,478 passing grades and 1,212 failures; the 559 girls made 11,774 passing grades and 1,389 failures, making a total of 21,252 passing grades and 2,601 failures made by the total enrolment. This is an approximate average of 8 passing grades to 1 failure for all pupils enrolled in the 23 classes.

In answer to the question, "How do pupils who leave the high school before completing the course compare in class standing with those who continue until graduation?" we have but to look over the results in Table III. From this we get a comparison between the graduates and non-graduates as to the relative percentage of failures in each group.

The graduates made a total of 16,474 passing grades and 1,037 failures, an average of 33.55 passing grades and 2.11 failures for each of the 491 pupils who graduated. This is an average of 15.88 passing grades for each failure made. The non-graduates made a total of 4,778 passing grades and 1,564 failures, an average of 8.67 passing grades and 2.84 failures for each of the 551 pupils who were eliminated. This is an average of 3.05 passing grades for each failure made. The total number of passing grades made for each failure made is approximately five times as great for the graduates as for the non-graduates.

The number of pupils who made no failures was 421, or 40 per cent of the total enrolment, leaving 621, or 60 per cent of the total enrolment, who made one or more failures. Of the graduating group, we find 215, or 44 per cent, who made no failures, and of the non-graduating group, 206, or 37 per cent, who made no failures.

There is approximately 6 per cent more of the graduates who made no failures than non-graduates; however, there were 74 who did not remain long enough to make any semester grades or failures. Many of these failed in their monthly examination and in all probability would have failed in their semester examinations. It seems only fair to separate these from the others when estimating the per cent of non-graduates who made no failures. If we eliminate these 74, we would have 132, or 28 per cent, who made no failures. There are then, approximately 16 per cent more graduates than non-graduates who made no failures.

TABLE III
PASSING GRADES AND FAILURE DISTRIBUTION BY SUBJECTS

SUBJECT	GRADUATES		NON-GRADUATES	
	Passing Grades	Failures	Passing Grades	Failures
English.....	2,110	125	1,011	316
Literature.....	1,313	65	107	38
Eng. grammar.....	378	22	38	10
Argumentation.....	8	0	1	0
Algebra.....	1,459	190	681	308
Geometry.....	1,257	122	249	131
Arithmetic.....	294	12	51	19
History.....	2,102	125	711	255
Civics.....	329	12	21	5
Economics.....	281	2	14	5
Com. geography.....	295	11	115	25
Latin.....	2,130	196	563	272
German.....	1,137	43	134	14
Physiology.....	188	7	105	18
Botany.....	300	2	110	16
Zoölogy.....	184	10	125	29
Chemistry.....	200	3	19	5
Physics.....	895	74	75	29
Man. training.....	487	8	191	14
Reviews.....	72	0	3	0
Sewing.....	72	2	6	0
Bookkeeping.....	162	4	72	5
Drawing.....	761	2	374	20
Music.....	60	0	1	0
Total.....	16,474	1,037	4,778	1,564

In Table III are listed the subjects studied and the total number of passing grades and failures made by the 1,042 pupils studied. The distribution is made for the two groups, graduates and non-graduates.

In order to discover if one subject more than another seems to influence elimination, we may make a comparative study through Tables III and IV. From these tables we may get the relative amount of failures in each subject as made by the different groups,

TABLE IV

SHOWING THE NUMBER OF PASSING GRADES MADE FOR EACH FAILURE BY BOTH THE GRADUATES AND THE NON-GRADUATES AND THE DIFFERENCE BETWEEN THE TWO IN THE NUMBER MADE

The percentage of failure of the number of the semester hours of work attempted is given for both the graduates and the non-graduates, also the difference between the amounts of the two groups.

	NUMBER OF PASSING GRADES MADE FOR EACH FAILURE			PERCENTAGE OF FAILURES MADE OF SEMESTER HOURS' WORK ATTEMPTED		
	Graduate	Non-Grad.	Difference	Graduate	Non-Grad.	Difference
English.....	16.88	3.20	12.68	5.59	23.81	18.22
Literature.....	20.20	2.82	17.38	4.72	26.81	21.49
Eng. grammar.....	17.18	3.80	13.38	5.50	20.42	14.92
Algebra.....	7.68	2.21	5.47	11.52	31.14	19.62
Geometry.....	10.30	1.90	8.40	8.85	34.47	25.62
Arithmetic.....	24.50	2.68	21.82	3.92	27.14	23.22
History.....	16.80	2.79	14.01	5.61	26.40	20.79
Civics.....	27.41	4.20	23.21	3.52	19.23	15.71
Economics.....	140.50	7.00	133.50	.71	12.50	11.79
Com. geography.....	26.82	4.60	22.22	3.59	17.86	14.27
Latin.....	10.86	2.07	8.78	8.43	32.57	24.14
German.....	26.44	3.05	23.39	3.64	24.72	21.08
Physiology.....	26.86	5.83	21.03	3.59	14.63	11.04
Botany.....	150.00	6.88	143.12	.66	12.70	12.04
Zoölogy.....	18.40	4.31	14.09	5.15	18.83	13.68
Chemistry.....	66.67	3.80	62.87	1.48	20.83	19.35
Physics.....	12.00	2.59	9.50	9.01	27.88	18.87
Man. training.....	60.88	13.64	47.24	1.62	6.83	5.21
Bookkeeping.....	40.50	14.40	26.10	2.41	6.40	2.08
Drawing.....	380.50	18.50	362.00	.26	5.08	4.82

graduates and non-graduates. We find that in three of the subjects—argumentation, music, and reviews—there are no failures recorded. So far as I was able to get any information about these subjects, the pupils received grades in the first two of those after they had completed a satisfactory amount of work, but if they failed to complete the required amount of work no record was made of the fact as a failure or otherwise. The subject “reviews” was nearly always given during the last semester of the Senior year,

and only when the pupil had been doing satisfactory work. Another subject, that of sewing, should also be noticed. It was usually given during the Senior year, and there are scarcely enough cases to make the results of a comparative study of the graduates and non-graduates reliable, because only a few of the non-graduates remain in school long enough to qualify as Seniors. Several other subjects seem to be of little value for making a comparative study, as there are so few grades. These subjects are grammar, arithmetic, civics, economics, chemistry, physics, and bookkeeping.

I find in comparing passing grades and failures made by those who graduated and by those who dropped out before completing the four-year course, that the graduates made a greater number of passing grades for every failure made in every subject with one exception, i.e., sewing. The non-graduates made 6 passing grades and no failures in this subject. The percentage of failures made by the two groups was less for the graduates with this one exception. The highest percentage of failure made by the non-graduates was 35 per cent, while the highest made by the graduates was 12 per cent. The average percentage of failure in the different subjects was 5 per cent for the graduates and 21 per cent for the non-graduates. The average percentage for the non-graduates was 16 per cent greater than the average for the graduates. The highest percentage of failure in any subject by the graduates was 12 per cent (in Latin), which was 9 per cent less than the average of the non-graduates in all subjects. The percentage of failure was about three to four times as great for the non-graduates as for the graduates. In a few subjects the difference is far greater than this; for example, in chemistry the percentage of failure is 14 times as great for the non-graduates as for the graduates; in economics the percentage of failure is 18 times as great for the former as for the latter; in botany, 19 times as great; and in drawing, almost 20 times as great for the former as for the latter. In two of these subjects there were so few of the non-graduate group who registered for the courses that the results do not have much significance. The two subjects referred to are economics and chemistry. In the latter subject there were 24 semester hours and in the former only 19 semester hours registered for by the pupils of the non-graduate

group. In the subject of drawing, the percentage of failure was so low in both cases that the comparison is of relatively little value. The percentage of failure was approximately 5 per cent for the non-graduates and $\frac{1}{4}$ of 1 per cent for the graduates.

After making a comparative study of the grades and failures made by the graduates and non-graduates one is led to believe that there is a distinct qualitative difference between the pupils whom the high schools graduate and those whom they eliminate. Not only is the difference noticeable when we compare the total number of passing grades and failures made by the different groups, but the difference is found to exist practically throughout all the courses of the curriculum.

COMPARATIVE STUDY OF THE DIFFICULTY OF THE SUBJECTS OF THE CURRICULUM

Is one subject of the curriculum more difficult than another for the high-school student? We may answer this question by making an analysis of Table V, the result of which seems to answer the question in the affirmative.

In comparing the percentage of failures in the different subjects by the whole body of students, without dividing them into graduates and non-graduates, we get the results indicated in Table V. This table shows the comparative difficulty of the different subjects as judged from the results of this particular group of students.

Algebra is the most difficult subject for the high-school pupils. In this subject they failed in almost 19 per cent of the semester hours of work attempted. The next hardest subject was Latin, geometry ranking almost as difficult.

COMPARATIVE STANDING OF THE TWO GROUPS

The specific problem is concerned with the relative standing of the pupils in the two different groups, the group that graduated and the group that was eliminated, as indicated by their marks and passing grades. In answer to the question, "Is there a distinct qualitative difference between the pupils whom the high schools graduate and those whom they eliminate?" I have already shown

in a previous section that there is a distinct difference in the percentage of failures made by the two groups, but have not shown whether this is offset by a relatively large percentage of high marks.

TABLE V

SHOWING THE NUMBER OF PASSING GRADES AND FAILURES MADE IN EACH SUBJECT
BY THE 1,042 PUPILS STUDIED

The average number of passing grades for each failure is shown and the per cent of failures in each subject.

	Passing Grades	Failure	Number of Passing Grades for Each Failure	Per Cent
English	3,121	441	7.09	12.38
Literature	1,420	103	13.79	6.76
Eng. grammar	416	32	13.00	7.14
Argumentation	9	0		
Algebra	2,140	498	4.30	18.88
Geometry	1,506	253	5.95	14.38
Arithmetic	345	31	11.13	8.24
History	2,813	380	7.40	12.21
Civics	350	17	20.59	4.63
Economics	295	7	42.14	2.32
Com. geography	410	36	11.39	8.07
Latin	2,693	488	5.75	14.81
German	1,271	87	14.61	6.41
Physiology	294	25	11.76	7.84
Botany	410	18	22.78	4.21
Zoölogy	309	39	7.92	11.21
Chemistry	219	8	27.38	3.52
Physics	970	103	9.42	11.88
Man. training	678	32	21.13	4.51
Reviews	75	0		
Sewing	78	2	39.00	2.50
Bookkeeping	234	9	26.00	3.70
Drawing	1,135	22	51.59	1.90
Music	61	0		

The standing of the pupils is indicated by the letters for the different degrees of efficiency as judged by the teachers from the class-work and examination. The following letters were used to denote the standing of the pupils: E, excellent; G, good; M, medium; P, poor; F, failure.

A study of Table VII shows that the percentage of failures is approximately four times as great for the non-graduates as for the graduates; that the percentage of poor grades is about 50 per cent greater for the non-graduates than for the graduates; the percentage of medium grades is approximately the same in both groups;

the percentage of good grades is more than 50 per cent greater for the graduates than for the non-graduates; and the percentage of excellent grades is approximately twice as great for the graduates as for the non-graduates. I found that the graduates had approximately 61 per cent of their grades above the medium grade, as compared with 37 per cent above the medium grade made by the non-graduates; and that 13 per cent of their grades were below the medium grades, while the non-graduates had 36 per cent of their

TABLE VI

SHOWING THE DISTRIBUTION OF GRADES RECEIVED BY THE TWO DIFFERENT GROUPS

	Excellent	Good	Medium	Poor	Failure
Graduates	2,121	8,464	4,540	1,272	1,037
Non-graduates	370	1,961	1,726	720	1,564

TABLE VII

SHOWING THE PERCENTAGE OF THE DIFFERENT GRADES RECEIVED BY THE TWO DIFFERENT GROUPS

	Excellent	Good	Medium	Poor	Failure
Graduates	12	49	26	7	6
Non-graduates	6	31	27	11	25

grades below medium. The percentage of medium grades made by the two groups was approximately the same, and the qualitative difference between the two groups is found in the percentage of grades which lie above and below the medium group. The larger percentage of the grades which the non-graduates have above the graduates in the lower grades is found to be shifted up the scale, not to the medium group, but on up to the two higher groups, thus showing a clear qualitative difference in favor of the graduate group.

AGE AND ELIMINATION

In making a study of the ages of the students entering the high school, I have not only distributed them according to the age of entering, but I have separated the students into two main groups, the graduates and the non-graduates; and under each of these

divisions I have made a further division, dividing each group according to sex.

Assuming that six years is the normal age for the child to enter school, and allowing eight years for the completion of the elementary and grammar-grade work, we have fourteen years as the normal age for entering the high school.

Taking fourteen, then, as the normal age for entering the high school, I found that 19 per cent of those entering were below normal, 35 per cent of normal age, and 46 per cent were above normal age.

TABLE VIII
AGE DISTRIBUTION

This table shows the age distribution of the graduates and non-graduates, the age distribution of boys and girls under each division, and the combined age distribution of all pupils at the time of entering the high school.

AGE	GRADUATES			NON-GRADUATES			COMBINED		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
11.....	0	0	0	0	1	1	0	1	1
12.....	10	9	19	5	2	7	15	11	26
13.....	49	62	111	25	28	53	74	90	164
14.....	89	120	209	71	86	157	160	206	366
15.....	42	65	107	65	85	150	107	150	257
16.....	15	17	32	64	57	121	79	74	153
17.....	12	1	13	26	16	42	38	17	55
18.....	.....	.....	.....	2	5	7	2	5	7
19.....	.....	.....	.....	1	1	2	1	1	2
20.....	.....	.....	.....	2	.....	2	2	.....	2
	217	274	491	261	281	542	478	555	1,033

Table VIII gives the number entering at any given age. Comparing the age distribution of the boys and girls, I found 19 per cent of the boys below normal age, 33 per cent of normal age, and 48 per cent above normal age. Of the girls, 18 per cent were below the normal age, 37 per cent of normal age, and 45 per cent above normal age. There were more boys by 3 per cent than girls above the normal age. The average age of the graduates was 14.12 and of the non-graduates 14.92 years.

So far as age alone is concerned, the pupils who enter the high school below the normal age have a higher expectancy of completing the course than those who are above the normal age. The least

percentage of elimination is found in the twelve-year-old group, and the percentage of elimination increases with the increase of the age of each group with the exception of the seventeen-year-old group of boys. In that group the percentage of elimination falls much below the percentage of elimination of the sixteen-year-old group.

There is a very marked increase in the percentage of elimination, between the fifteen-year-old group and the sixteen-year-old group, a difference of approximately 20 per cent.

Of the non-graduates 5 boys and 4 girls did not give their ages.

Table IX shows that considerably over half were eliminated of all those who entered high school above the normal age. Of the age groups ranging from fifteen to seventeen inclusive, we note

TABLE IX
PERCENTAGE OF DIFFERENT AGES ELIMINATED

Age	Boys	Girls	Combined
12.....	33	18	27
13.....	34	31	32
14.....	44	42	43
15.....	61	57	58
16.....	81	77	79
17.....	68	94	76

that from 58 per cent to 79 per cent were eliminated, with a total elimination of 68 per cent of all those who entered above fourteen years of age. Of the age groups below fourteen, only 32 per cent were eliminated and 68 per cent were retained. Of the pupils entering at normal ages I found 58 per cent were retained and 42 per cent were eliminated. Comparing those entering the high school below normal age with those entering above normal age, I found 68 per cent of the former were retained, while only 32 per cent of the latter were retained. The elimination was only 32 per cent of the former group, while 68 per cent of the latter group dropped out before completing the four-year high-school course.

Large numbers of the older pupils dropped out to go to work, many were attracted to the short courses of the "business colleges," and some entered the universities and colleges as unclassified students, taking courses which appealed to them.